**ADA LAB WEEK 6**

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**1BM22CS421**

**Q1) Knapsack problem using C.**

#include <stdio.h>

int v[10][10];

int p[10],w[10];

int n,m;

int max(int x, int y){

    if(x>y)

        return x;

    else

        return y;

}

void knapsack(){

    int x[10];

    for(int i=0;i<=n;i++){

        for(int j=0;j<=m;j++){

            if(i==0 || j==0){

                v[i][j]=0;

            }

            else if(j-w[i]<0){

                v[i][j]=v[i-1][j];

            }

            else{

                v[i][j]=max(v[i-1][j],v[i-1][j-w[i]]+p[i]);

            }

        }

    }

    printf("Output is:\n");

    for(int i=0;i<=n;i++){

        for(int j=0;j<=m;j++){

            printf("%d ",v[i][j]);

        }

        printf("\n");

    }

    printf("Highest profit= %d\n",v[n][m]);

    int j=m;

    int i=n;

    printf("Optimal solution\n");

    while(j>0){

        if(v[i][j]!=v[i-1][j]){

            x[i]=1;

            j=j-w[i];

        }

        else{

            x[i]=0;

        }

    }

    for (i = 1; i <= n; i++){

        printf("%d\t", x[i]);

    }

}

int main(){

    printf("enter the number of items:\t");

    scanf("%d",&n);

    printf("enter the max capacity of knapsack:\t");

    scanf("%d",&m);

    printf("enter the weights of all items:\n");

    for(int i=1;i<n;i++){

        scanf("%d",&w[i]);

    }

    printf("enter the profits of all items:\n");

    for(int i=1;i<n;i++){

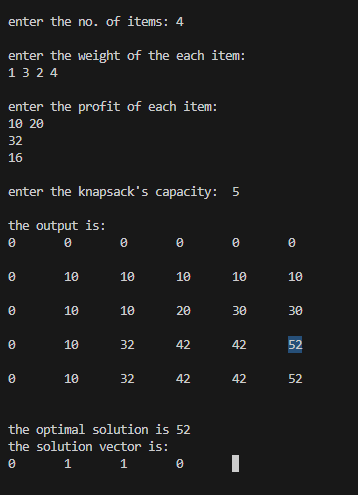
        scanf("%d",&p[i]);

    }

    knapsack();

    return 0;

}

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